ICSU

Grand plans for global changes

Ottawa

THE International Council of Scientific Unions (ICSU) last week approved in principle a major international inter-disciplinary research programme on interactions of the geosphere and the biosphere. The aim of the programme is to understand global change over long time-scales, and in particular the influence of man on the environment.

Advocates of the venture, to be called the International Geosphere Biosphere Program (IGBP), argue that instruments now becoming available should be used in a coordinated fashion to monitor environmental changes that might affect human civilization as the Earth's population increases. Specific proposals are so far lacking; but the fate of carbon in the ocean and the long-term effects of high-yield agriculture on soils are likely to figure prominently.

But despite the laudable sentiments expressed last week by those seeking to avert possible environmental disaster, many were critical of what they saw as woolly thinking. Professor Tom Malone of the US National Academy of Sciences, a prominent champion of IGBP, promoted J. E. Lovelock's "Gaia" superorganism concept of the global environment, an idea most biologists find untenable. Speaker after speaker at a day-long symposium at last week's ICSU meeting emphasized the inter-relatedness of various facets of the geosphere and biosphere without specifying what new studies were needed.

Interestingly, some of the reactions heard last week may reflect the different styles of science in Europe and North America. One summary talk that featured a slide of starving children was privately criticized by some European delegates for using cheap tactics, while being praised for its effectiveness by American scientists. The second group argued that the purpose of the symposium was to stir delegates to action rather than to advance understanding.

The British Royal Society has been the leading the opposition to IGBP, believing that unless it was more carefully focused, the project could divert attention, and possibly resources, from existing international studies such as the World Climate Research Program. Some of the ideas canvassed for IGBP last week were nothing if not ambitious, with up to 50 dedicated Earth satellites being proposed. A compromise put forward by Academician V.V. Belousov of the Soviet Union and agreed by the general assembly calls for an *ad hoc* committee to work out specific proposals for IGBP in time for the next ICSU general assembly in 2 years' time. Sir Arnold Burgen, foreign affairs secretary of the Royal Society, said he was "quite happy" with Belousov's formula.

Everybody stresses that the programme is unlikely to produce data before the 1990s, and that the sort of long-term data acquisition needed will require a shift of attitudes from short-term fashionable projects towards more methodical data collection. But the success of International Geophysical Year in the late 1950s is being held up as an example of what might be achieved. **Tim Beardsley**

Visas denied

THE Ottawa meeting of ICSU was marred by angry exchanges and protests by the Soviet delegation at the denial of entry visas to two Soviet representatives. A statement by the Canadian Ministry of External Affairs read out at the meeting said the government had ensured visas for "all *bona fide* scientists" to facilitate free association.

The two excluded Soviets were Dr V. K. Dobrosel'skii and Mr A.A. Kokoshin. Dobrosel'skii is, ironically a member of ICSU's standing committee on the free circulation of scientists. He is also widely rumoured to hold the rank of brigadier in the KGB (the Soviet secret police) and has previously been denied entry to other Western countries. Soviet delegates, insisted however, that Dobrosel'skii has several "outstanding" inventions to his credit. There was more puzzlement over the exclusion of Kokoshin, who is a member of ICSU's committee on science and technology in developing countries.

Most found the exclusions surprising and regrettable. There is no obvious rationale for a political reprisal by the newly elected Canadian Government, and some observers from Western nations believe Dobrosel'skii has genuinely worked for free movement of scientists regardless of what other positions he may hold. Everyone recognizes a grey area — ICSU has never consisted solely of active research scientists — and, as one US delegate observed, "we've some good scientists in the CIA" (Central Intelligence Agency). The assembly passed a resolution expressing its "deep concern" that entry visas were still being denied to scientists attending international meetings, singling out the governments of India, the Soviet Union and Canada. ICSU-sponsored activities will not be held in these countries until solutions have been found.

Visa problems also explain the Indian National Science Academy's decision to withdraw its offer to host the next ICSU general assembly; it has apparently been unable to secure the guarantee required by ICSU that scientists would be allowed entry visas. The 1986 general assembly will instead be held in Switzerland, but India may still be the host in 1988. Tim Beardsley

Drugs in athletics

Mortality of Soviet athletes

SUSPICIONS that the Soviet Union, and possibly some other socialist-bloc countries, routinely use anabolic steroids and other biochemicals in the training of athletes have now been fanned by an underground report which reached the West at the end of July, just in time for the Los Angeles Olympic Games. The report lists the names of 59 former Soviet Olympic competitors (including 26 medallists) from the 1952 games onwards, who have since died. The list, it is claimed, was compiled with the participation of Soviet athletes, many of whom fear for their own life-expectancy as a result of training procedures.

Although the list includes a few cases of

accidental death not related to sports, the overall figures show a death rate of 17.1 per thousand competitors, whereas the corresponding figure for the United States over the same period is 4.5 per 1,000 and for the United Kingdom 2.1 per 1,000. Deaths occurred most frequently in the 41–50 age group (18), 31–40 (11) and under 30 (9). The death rate, according to these figures, has more than doubled since 1976, while remaining stable or even decreasing elsewhere.

The conclusion that these figures are related in some way to specifically Soviet training practices has been challenged by Michael Kessis, a physical education instructor in California who edits the *Soviet Sports Review* (a collection of translations from the Soviet sports press), but not, so far, by the Soviets themselves.

Thus, in a comment on "anti-Soviet" attitude in Los Angeles, *Literaturnaya Gazeta* did not deny the deaths but merely pointed out that Vsevolod Bobrov, the hockey-player, had been "approaching 60" when he died (he was in fact 57) and that Valerii Kharlamov (another hockey-player) and Valerii Popenchenko (a boxer) had died in "tragic accidents".

Apart from accidental victims, the

deceased athletes received no obituaries in the Soviet media, but the TASS correspondent in New York, Vladimir Kikilo, was able to confirm a number of the deaths. Given the uncertain provenance of the document, it would otherwise have been necessary to check its contents by a scan of the Soviet sporting press for the last

Mortality of Olympic medallists (1952–76*) by age group at time of death

Age	Soviet Union	United States	Germany (FRG & GDR)**
30 and under	9	7	3
31–40	11	1	3
41–50	18	4	4
51–60	7	1	2
61+	1	1	0
Total deaths	46	14	12
Those dying in 1976–82	26	3	4
Total medallists	1,033	784	786
%Deaths	4.45	1.79	1.53

*The 1980 Moscow games are omitted from this survey due to the US boycott.
**Figures amalgamated because in 1952 East Germany did not compete and from 1956 to 1964 the two Germanies fielded a joint squad.

recorded appearance of the listed competitors.

The ban on the use of anabolic steroids for athletes makes it difficult to obtain statistically significant data on their long-term effects. Earlier this year, however, *The American Journal of Sports Medicine* listed no fewer than twelve steroid-related disorders, ranging from testicular atrophy in males and virilization in females to hepatic dysfunction, hypertension, changes in cholesterol composition, tumours, changes in connective tissue and psychosis.

There have also been suggestions that the Soviets may be administering to their athletes carnitine (involved in fatty acid metabolism), potassium orotate (an intermediary in the biosynthesis of pyrimidine nucleotides) and inosine (also involved in pyrimidine nucleotide synthesis and in the formation and breakdown of high-energy phosphates). Such compounds could serve both as performance enhancers and to counteract the short-term side effects of steroids. The long-term effects of high dosages are, however, unknown.

The mortality report on Soviet athletes — if accepted abroad — could serve as a grim warning to athletes and trainers in other countries who might feel tempted to resort to unauthorized aids. The status of the document, however, is still far from decided. Attempts by the "Smolosky" human rights group in the United States to bring it to the attention of the International Olympic Committee in Los Angeles proved unsuccessful.

Part of the explanation for that may have been the absence of a Soviet Olympic team, which in turn is held by many in Eastern Europe as well as the West to have been caused by Soviet reluctance to submit athletes to the sophisticated drug tests installed at Los Angeles. **Vera Rich**

Heavy-ion research

European ambitions multiply

GANIL, the new French accelerator for heavy ions at Caen in Normandy, is to close down for January to save electricity. GANIL must save 12 per cent as its contribution to last year's budget cuts, but director Claude Detraz is not perturbed. "We're stopping in January when electricity is most expensive", he says, "and anyway we're finding we've got plenty to do when the machine's off."

In fact, Detraz is buoyant about the performance of his accelerator. He is even happy with his budget — which he believes to be quite sufficient to "sweep the field" in intermediate energy heavy-ion collisions. Detraz claims that GANIL is three years ahead of any other accelerator in performance and beam intensity and is making many interesting — and unexplained — discoveries. What GANIL needs, he says, is not money but a team of committed theorists to help explain the effects being revealed.

The accelerator at Caen is the latest of a clutch of European heavy-ion machines (others are in West Germany and Britain) dedicated to the study of the gross properties of nuclei rather than the structure of nucleons and other particles, with which high-energy physics is now preoccupied.

Detraz says he is enticing French theorists to GANIL with discoveries such as that of isolated excited states of the nucleus 100 MeV above the ground state (where previously only a continuum of states was expected), the apparent failure of thermodynamic models of the excited nucleus and strong forward scattering (a kind of nuclear transparency) at total nuclear energies above 40 GeV. Other GANIL products (detectable because of high beam intensity) are exotic neutron-rich nuclei such as nitrogen-23, neon-29 and neon-30 as well as highly-charged positron-emitting atoms. "It's a gold-mine", says Detraz.

GANIL, however, is not alone in the mine. In Britain, working another seam, the Nuclear Structure Facility (NSF) may have taken a lead in high-spin nuclear physics, where nuclei are spun to such angular momenta that Coriolis and centrifugal forces are comparable with nuclear forces. NSF is planning a major extension of its Van de Graaff accelerator, the largest in existence, by means of a superconducting linac.

In West Germany also, the heavy-ion laboratory (GSI) near Darmstadt is basking in the discovery of elements 108 and 109, and has won outline approval for a substantial extension. And Italy is building an advanced superconducting cyclotron in Milan, although the project was set back recently by the untimely death of its designer.

GANIL itself uses a pair of separated-sector cyclotrons to accelerate a wide range of nuclei from 100 MeV per nucleon (for light ions) up to 10 MeV per nucleon (for the heaviest). In low-energy nuclear accelerators (such as NSF), nuclei approach at velocities that are small compared with the internal velocities of their nucleons, so that internal structures are rearranged before collisions. At much higher energies (such as the GeV per nucleon available at Berkeley, California), on the other hand, collision velocity is much faster than the internal motions, and nuclei collide like bags of stationary separate particles. But at GANIL — the intermediate region — the velocities are roughly equal, so that simple approximations do not apply. Hence perhaps, the lack of enthusiasm of theorists, whom Detraz claims are nevertheless being won round by the challenge of GANIL.

NSF (at Daresbury, Cheshire) is making its mark because of its stable and turnable particle beams (a consequence of eletrostatic acceleration), the range of nuclei which can be accelerated ("virtually the whole periodic table" according to a Daresbury experimenter), and a superb detector of gamma-emission from high spin states which can discriminate against Compton-scattered radiation.

Daresbury now plans to abandon the original target of a 30 MV terminal voltage, to stay with the present 20 MV but to put all its effort into developing a superconducting linac stage after the Van de Graaff. This would give NSF the capability of colliding uranium with uranium. The proposal has not yet gone to the nuclear physics board of the Science and Engineering Research Council that would fund it, but the extension could be built segment by segment without increasing the budget, they say in Cheshire.

Meanwhile, GSI Darmstadt plans to add a synchrotron and a storage ring to its present UNILAC linac (which is capable of colliding nuclei at around 20 MeV per nucleon). The additions would bring GSI up to 1.3 GeV per nucleon at high intensity, making possible a search for new states of condensed nuclear matter. The GSI additions are all but finally approved, a federal government spokesman in Bonn said last week, with a decision due "before the end of the year".

With work in this field also at CERN (the European Organisation for Nuclear Physics near Geneva) and progress in Italy, the chauvinistic cry is getting louder in Europe that the old continent has taken "an unquestionable world lead" in nuclear matter studies. That, of course, was what the particle physicists were saying until President Reagan gave the go-ahead to the super-conducting super-collider now being built as an adjunct to the Stanford Linear Accelerator Center and which may steal a march on CERN's new large electron–positron storage ring. **Robert Walgate**